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# Facilities Planning Summary. Title II. Federal Water Pollution Control Act, Amendments of 1972

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# SUMMARY

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# F A C I L I T I E S  P L A N N I N G

# S U M M A R Y

Title II
Federal Water Pollution Control Act
Amendments of 1972

U. S. Environmental Protection Agency
Washington, D. C. 20460
January 1974

# FOREWORD

The central thrust in EPA implementation of the new water bill (P.L. 92-500) is maximizing environmental effectiveness of actions taken, including those concerning the accelerated program of building new and improved publicly-owned treatment works. The great amount of money that will inevitably be spent for publicly-owned treatment works as a result of the Act should be used to the best effect in meeting its goals.

At the heart of cost-effectiveness is the development and costing of alternatives before construction. These alternatives may variously involve land treatment or reuse of wastewater, flow reduction measures (including the correction of excessive infiltration or inflow), the treatment of overflows, alternative system configurations, phased development of facilities, or improvements in operation and maintenance. EPA will require that such alternatives be considered for any projects it helps to fund.

The alternatives must also be judged in terms of their net environmental effect. Care should be taken that pollutants addressed are germane to the local water quality problem, and that abatement practices to restore surface water do not shift an environmental problem to other, less remediable media.

Facilities planning, as provided for under Federal regulations and described in this summary, is intended to accomplish the above objectives. The planning process features systematic economic and environmental evaluation of feasible alternatives and public involvement in the choice among the alternatives. The plan would provide information needed for EPA preparation of an Environmental Impact Statement which the law requires for federally funded projects. This approach is intended to assure the selection and development of cost-effective and environmentally sound treatment works which will meet the effluent limitations prescribed by the law. To achieve these goals, the facilities planning approach can be neither piece-meal nor short sighted. Rather, the geographic scope of planning should be sufficient to avoid foreclosing consideration of cost-effective alternatives and future facility needs should be forecast so that the facilities developed can be readily modified without undue expense as changes occur.

This summary is supplemented by more detailed guidance. The "Guidance for Facilities Planning" is expected to serve continuously as a useful planning tool. Thus, the guidance will be up-dated when necessary to incorporate changes and additional information as developed.

Copies of this summary or the guidance may be obtained from the EPA Regional Office in your area.

Robert L. Sansom
Assistant Administrator
for Air and Water Programs (AW-443)

## INTRODUCTION

As water pollution control activities have progressed from the scattered construction of sewage treatment plants to abate very gross pollution problems to the present situation in which both national and State policies call for high quality water in all the nation's streams, lakes, and coastal waters, the importance of careful planning has become evident. Without planning, some water quality problems would not be solved and might become worse. In other cases, far more money than necessary would be spent to solve a water quality problem.

The Federal Water Pollution Control Act Amendments of 1972 reaffirmed the importance of planning, and contained some new provisions intended to help achieve the national objective of clean water. In emphasizing the process of planning, EPA is consistent with trends in the planning of public transportation and other water resources facilities. Process guidance allows much more flexibility in meeting local conditions than does guidance prescribing in minute detail what is to be done. To afford a general understanding of facilities planning, this summary briefly describes the nature of the facilities planning process and the steps involved. More complete procedural guidance designed to be used by engineers and planners is presented in the "Guidance for Facilities Planning" published by EPA.

The public facilities planning process is basically one of stating and clarifying the problems, inventorying the existing systems, projecting future conditions, setting goals and objectives, developing alternatives to meet those goals and objectives, assessing the impacts of the alternatives, selecting plan elements, and developing implementation mechanisms. Some of the more specific aspects of water quality facilities planning are shown in Figure 1. These steps are not necessarily done in this sequence, though the general order would be similar.

## OBJECTIVES

The 1972 Amendments require application of secondary treatment as a minimum and provision by 1983 for applying the Best Practicable Waste Treatment Technology (BPWTT). The later provision applies to facilities funded from FY 1975 and later allotments. The criteria for BPWTT are described in the Federal Regulations (40 CFR Part 137 "Information on Alternative Waste Management Techniques and Systems to Achieve Best Practicable Waste Treatment"). The three general approaches are:

a) treatment and discharge to receiving waters,

b) treatment and reuse, and

c) land application.

If the water quality standards cannot be met with the Best Practicable Waste Treatment Technology, additional measures providing for further pollutant reductions may be needed. Examples of other measures include advanced waste treatment, temporary storage of treated effluent, and facilities for abating pollution from combined sewer overflows.

Reuse includes a wide range of choices, such as irrigation of crops or forests, cooling water, manufacturing, recreation, and esthetic purposes, and certain municipal supply uses.

## PLAN COMPONENTS

All facilities plans are to include at least the following elements as set forth in Federal Regulations 40 CFR Part 35, Subpart E (Grants for Construction of Treatment Works):

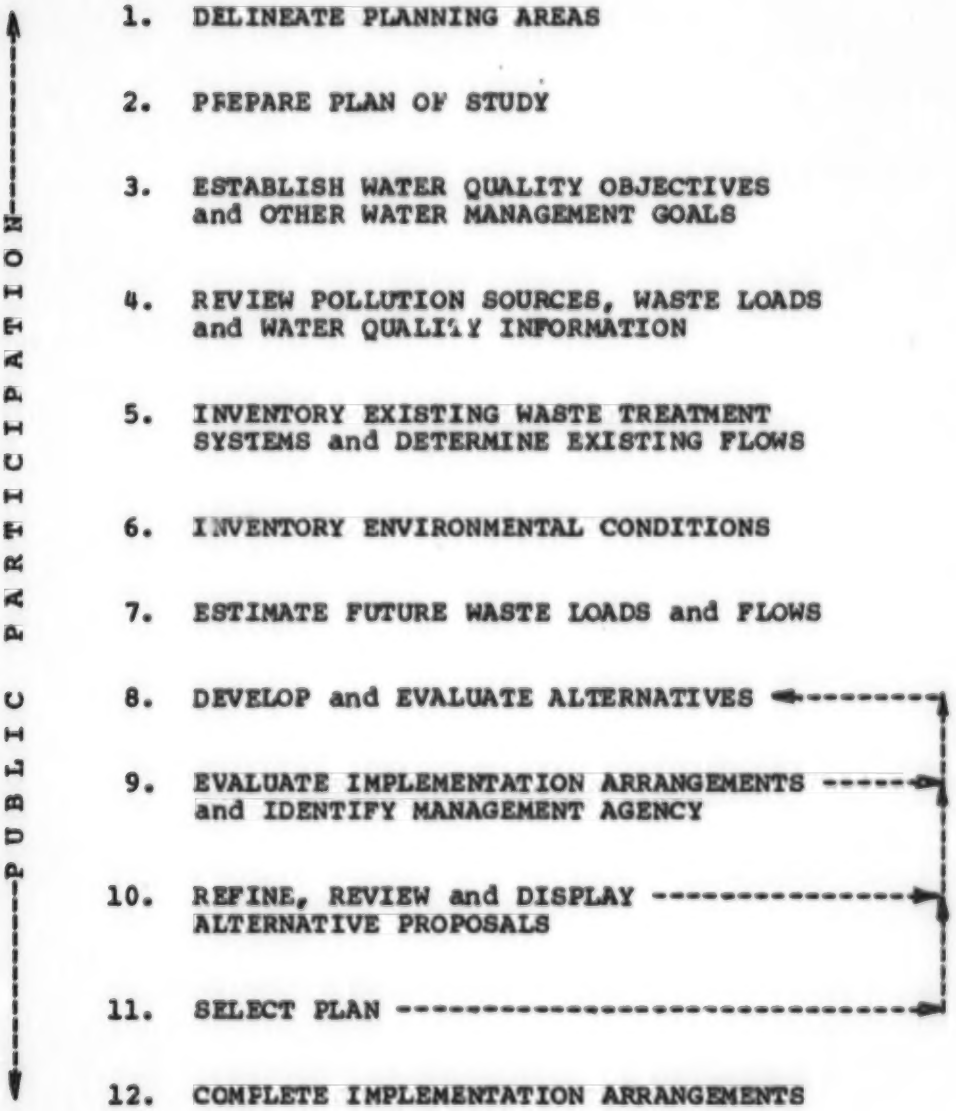
a) A statement of the problem.

b) A description of proposed treatment works included in the first stage for which construction drawings and specifications are to be prepared. Cost estimates and schedules are to be included.

c) A description of the complete wastewater management system of which the treatment works are a part.

FIGURE 1

FACILITIES PLANNING PROCESS


PUBLIC PARTICIPATION
1. DELINEATE PLANNING AREAS
2. PREPARE PLAN OF STUDY
3. ESTABLISH WATER QUALITY OBJECTIVES and OTHER WATER MANAGEMENT GOALS
4. REVIEW POLLUTION SOURCES, WASTE LOADS and WATER QUALITY INFORMATION
5. INVENTORY EXISTING WASTE TREATMENT SYSTEMS and DETERMINE EXISTING FLOWS
6. INVENTORY ENVIRONMENTAL CONDITIONS
7. ESTIMATE FUTURE WASTE LOADS and FLOWS
8. DEVELOP and EVALUATE ALTERNATIVES
9. EVALUATE IMPLEMENTATION ARRANGEMENTS and IDENTIFY MANAGEMENT AGENCY
10. REFINE, REVIEW and DISPLAY ALTERNATIVE PROPOSALS
11. SELECT PLAN
12. COMPLETE IMPLEMENTATION ARRANGEMENTS

d) Sewer system infiltration/inflow documentation.

e) A cost-effectiveness analysis of the selected system and alternatives to that system.

f) An environmental evaluation of the alternatives considered.

g) An identification of effluent discharge limitations, or where permits have been issued, a copy of the permit for the proposed treatment works as required by the National Pollutant Discharge Elimination System.

h) Comments and approvals of State and local agencies, including compliance with OMB Circular A-95.

i) A summary of any public meeting or hearing held to consider the plan.

j) A statement demonstrating the authorities implementing the plan have the necessary legal, financial, institutional, and managerial resources.

Elements (c) and (e) of the plan are to cover a 20 year period. Future system expansions and other modifications, with the appropriate cost estimates, and a program for staged development and implementation are to be included.

The steps taken in the planning process, including public involvement, must be documented in the plan.

## STATE RESPONSIBILITIES

The State has overall program control for facilities planning, State priorities for construction of publicly-owned treatment works, and, where the State has permit issuance authority, compliance schedules for municipal permits. The State establishes priorities and scheduling of facilities plans, delineates planning areas, reviews plans of study and certifies that the plan meets requirements of the regulations (40 CFR Part 35, Subpart E).

## FACILITIES PLANNING PROCESS

The facilities planning process has been outlined in Figure 1. Many of those steps are self-explanatory. Only a few highlights will be discussed in this summary.

First, it may appear from Figure 1 that the steps follow one after another with a clear-cut beginning and end to each step. Ordinarily this would not be the case. After some of the basic information is assembled on the nature of the problem (water quality objectives, pollution sources, waste loads, present water quality, and existing systems), alternative plans can be assembled quickly and given preliminary screening. A large amount of iteration of steps occurs and the sequence of steps may well be unclear. This early assembly of alternatives and preliminary screening is essentially a qualitative, judgement process, which might take no more than a week or two to complete in simple cases. (In more complex situations, or where little background information and experience are available, a longer period would be required.)

Most of the remainder of the planning process consists of detailed impact assessment and refinement of alternative plans. The impact assessment and refinement of plans is accomplished in part by means of public involvement. Throughout the impact assessment and alternative refinement process, the groundwork is being laid for plan selection and completion of implementation arrangements.

## Delineating Planning Areas

The State has the responsibility of establishing planning areas. It is essential to outline a geographic area sufficiently large to permit full evaluation of alternatives. Each planning area should include that entire area where cost savings, other management advantages, or environmental improvement may result from interconnection of sewer systems, provision of joint facilities such as those for sludge or treated effluent disposal, or collective management of individual waste treatment systems. In addition, the planning area should be broad enough to permit evaluation of the cumulative environmental impacts of the feasible alternatives.

The planning area boundaries should ordinarily include at least the core city, contiguous developed areas, and areas subject to development within the planning period. Where joint facilities or collective waste management for two or more communities may be feasible options, the planning area should include the community group. Planning for an area, such as those described, does not necessarily mean that a single wastewater management agency must be formed, although this could be one of the options. Rather, planning for the entire area is needed to permit adequate

evaluation of available options for wastewater management. When the entire area is considered, the effects of an option on other parts of the area can be more fully assessed. Where planning for an entire metropolitan area is not practicable, the area should be sufficient to permit realistic comparison of a full range of alternatives including waste treatment technologies and sludge disposal options. This is particularly important where joint facilities for adjacent individual waste treatment systems may be a feasible alternative.

## Plan of Study

Prior to initiating facilities planning, a plan of study will be prepared by the planning entity and approved by the state and EPA. The plan of study will present the planning area; planning entities; the nature, scope and complexity of the planning effort; an itemized list of specific planning tasks; schedule for the tasks; and an itemized breakdown of planning costs.

## Water Quality Objectives and Other Goals

As a minimum, wastewater management works should provide secondary treatment immediately and for scheduled future application of Best Practicable Waste Treatment Technology. More stringent requirements will pertain in some places. Other goals would be incorporated as appropriate.

## Future Waste Loads and Flows

Forecasts of waste loads and flows should be based on evaluation of land use plans, economic and demographic growth trends, growth constraints, zoning restrictions and permit conditions. Extension of past growth trends should not be the sole basis for projection. Indeed, it is often possible to control the amount of future waste loads and flows by a combination of measures that can be included in the facilities plan.

## Developing and Evaluating Alternatives

As an initial step in alternative development, the performance obtainable through optimum operation and maintenance of existing facilities should be determined and

used as a baseline for subsequent planning. There are four typical sets of subsystems (flow and waste reduction measures, sewers, wastewater management techniques, and sludge disposal) to be considered in establishing system alternatives. Some combination of these subsystems would be developed for each location to form a system. The alternative systems are screened and subjected to impact assessment and evaluative criteria in order to select the best alternative. This is not an unfamiliar process.

A few additional comments are in order in this summary. Industrial users of the area should be served whenever practicable and cost-effective. Flow and waste reduction measures are encouraged. At least one alternative will be developed and evaluated for each of the three waste management technique categories (see objectives) unless preliminary screening clearly demonstrates lack of feasibility. System flexibility and reliability should be given explicit attention.

### Planning Detail

The plan should contain sufficient detail to assure that the effluent limitations, water quality goals and technical criteria are met and the selected system is better than the alternatives considered. Implementation details should be complete. Ordinarily this will lead to substantially less detail in simple planning situations than in the complex cases.

## MONETARY EVALUATION

### Costs and Revenues

Monetary costs of the plan include all capital costs; operation, maintenance, and replacement costs; and costs for managing or implementing flow and waste reduction measures that are part of the plan. Revenues included in this evaluation are those derived from implementing the plan. Other effects, both costs and benefits, are considered in the environmental evaluation.

### Calculation Methods

All monetary costs and revenues incurred throughout the planning period are expressed either as a present worth or

equivalent annual cost over the planning period. These figures are obtained by means of compound interest calculations, with the interest rate being the Federal discount rate published in the Water Resources Council's "Principles and Standards for Planning Water and Related Land Resources". For the year 1974, that figure is 6 7/8%. Procedures for making these calculations are well-known and are described in such books as Principles of Engineering Economy by Eugene L. Grant and W. Grant Ireson, and Economics of Water Resources Planning by L. Douglas James and Robert Lee.

## Salvage Value

In making the calculations, salvage values for land are market value at the time of analysis. The salvage value of rights-of-way and easements should not be greater than their market value at the time of the analysis. The salvage value of permanent structures and equipment can ordinarily be based on straight line depreciation over the assumed service life of the item.

## Sunk Costs

Investments and cost commitments made prior to or concurrent with the facilities planning study are sunk costs and not included in the monetary evaluation. Examples include a) investments in existing wastewater treatment facilities and lands, b) outstanding bond indebtedness, and c) cost of preparing the facilities plan. The only costs and revenues to be included in the monetary evaluation are those costs associated with implementing the plan.

## Cost Estimates

Cost estimates should be accurate enough to assure reliable selection of the best alternative solutions. In the preliminary screening of alternatives, these estimates can be gross costs, with corresponding accuracy. For the detailed cost analysis, there should be a) unit process and sewer line costs that apply to the locality, b) preliminary engineering layouts and quantity estimates, and c) gross land and easement appraisals.

Except in extraordinary circumstances, costs and revenues should be calculated on the basis of market prices prevailing at the time of the analysis. If there is strong

reason to believe the costs and revenue will depart markedly from the general levels of prices, an inflation or deflation factor may be used; although, in general, it is omitted.

Contingency allowances may be included and accompanied by an analysis, which may be a narrative, regarding over or under utilization of capacity.

## ENVIRONMENTAL EVALUATION

Facilities plans are subject to the National Environmental Policy Act of 1969. An environmental assessment is to be a part of each facilities plan. This assessment will facilitate preparation of an Environmental Impact Statement by EPA, in order to carry out the provisions of that Act.

The environmental evaluation should be an integral part and major tool of the planning process. It is one of the major analyses of alternatives, along with the evaluations of systems performance and monetary factors. The evaluation should include an inventory of existing environmental conditions and analyses of expected environmental effects of implementing significant alternatives.

The environmental evaluation should begin early in the planning process, for several reasons. First, it takes a substantial period of time to do an adequate environmental evaluation, even in cases where the total amount of effort required is small. (The lengthy time period results from time lags in assembling pertinent data, interviewing people, observing environmental conditions at several times during a year, etc.) Second, the environmental evaluation should have some impact on the initial assumptions, development and screening of alternatives.

Note that environmental impact may be either adverse or beneficial; it is not restricted to the former. These are the basic questions asked in screening alternatives, and it may be seen that there is a close parallel between environmental impact evaluation and the steps in the facilities planning process.

## PLAN SELECTION AND IMPLEMENTATION

### Plan Selection

There is no prescribed method for choosing the best proposal and no rigorous analytical method is available either. However, there are some minimum criteria for plan selection, and some evaluation factors can be suggested for carrying the analysis beyond the bare minimum requirements.

The minimum criterion is that the plan must meet the applicable regulatcry requirements. These include effluent limitations and load allocations, compliance schedules, etc. Additional requirements, imposed by Federal, State, and local governments, may also apply.

If the public involvement program and the environmental evaluation have been well done the important issues and evaluative factors should be known by the time a plan selection is made. Each alternative should be analyzed from the standpoint of each of the evaluative factors. The results of these analyses then need to be displayed in such a way as to facilitate comparison of the alternatives. The comparison may be done pairwise, taking two alternatives at a time, or by means of ranking and/or weighting all alternatives so that a composite score can be used in making the selection. The latter approach entails some risk because it aggregates so much information and because the relative importance of the evaluative factors will be different to the various segments of the public, to the constituent local governments, and to the reviewing agencies.

One possible list of evaluative factors is given in Figure 2. Some of these factors are highly aggregated and are indicative rather than mandatory, although each of the factors would be relevant to plan selection.

### Plan Implementation

The three essential ingredients for plan implementation are public support, institutional arrangements, and a financial program and schedule. Public support is an outgrowth of the public involvement program.

Institutional arrangements will, of course, vary from place to place, and will often be an outgrowth or product of the plan. It must contain, at a minimum, the local

FIGURE 2

EVALUATIVE FACTORS

| | ALTERNATIVE PROPOSALS | | | |
|---|---|---|---|---|
| | P-1 | P-2 | P-3 | P-4 |
| 1. Environmental Effects | | | | |
| 2. Monetary Costs (least total costs) | | | | |
| 3. Implementation Capability | | | | |
| 4. Contributions to Objectives and Goals | | | | |
| 5. Energy and Resources Use (overall appraisal) | | | | |
| 6. Reliability | | | | |
| 7. Public Acceptability | | | | |
| 8. Flexibility | | | | |

government resolutions of assurance that the plan will be carried out. In some cases, it might involve the creation of a new agency to finance, operate, and maintain the adopted system. In yet other cases, it might consist of contracts among the constituent governments.

The financial program and schedule must contain estimates of non-federal expenditures for implementing the first stage of the plans, and a method for acquiring those funds. If industrial users are part of the system, a cost allocation between industrial users and other users must be made and a means be available to recover from industrial users that portion of the grant amount allocable to the treatment of industrial wastes. The capital and operating expenditures should be given for each of the first 10 years covered by the plan.

## PUBLIC INVOLVEMENT

Public involvement is a necessary part of the facilities planning process. It is required in the 1972 Act Amendments and is discussed more fully in 40 CFR Part 35, Subpart E and in 40 CFR 105 (Public Participation in Water Pollution Control).

Wastewater management affects a wide range of economic, social, environmental and institutional interests. It must be planned and implemented in a manner which meets with public satisfaction. Public involvement in the facilities planning process facilitates the identification of public preferences and fosters the development of the choice among alternative solutions for satisfying public needs.

Public involvement should begin with the earliest possible steps of the planning process and continue throughout. It must emphasize identifying affected public interests and providing opportunities for those interests to be expressed and considered by other publics, planners and elected officials. The integration of public involvement with the planning process increases the probability of plan implementation. It encourages the timely recognition and handling of public interest conflicts so that greater public support and understanding may be generated for the plans.

## Objectives

Some of the specific objectives of public involvement are a) increased public awareness of the need for pollution abatement and the implications of meeting those needs, b) opening channels of communication between planners and the public, c) resolution of conflict, and d) building trust and commitment.

## Planner's Role

The planner may play several roles in the planning process. At times he is an information-giver, informing the public about the nature of the problem or the alternatives available for dealing with the problem. At other times, he is a coordinator, helping various segments of the public, local government officials, and planners understand each other and keep pace with developments. He may perform as a catalyst, bringing about a situation where things happen without the planner taking a prominant part in the events. He may even need to be an advocate planner at times.

A number of things should happen in the public involvement process. Issues should be defined and clarified. The nature of the impacts of the various alternatives should be determined. The feasibility of alternatives should be established. A continually refined ordering of public priorities as they pertain to water quality should be accomplished. A better understanding of the probable course of future events should be developed.

Not all these things are done by the planner, although the planner should be active in getting them to happen. The planner needs to strive especially to represent or have represented the interests of segments of the public who, for one reason or another, are not actively represented in the planning process, including future area residents, and affected parties outside the boundaries of the area.

## Strategy

The details of the public involvement program for facilities planning will be different in each area because of differing local conditions. A program or strategy for public involvement should be developed at the beginning of the facilities planning process. The program should be developed with representatives of the public. It should provide for early and continuous involvement throughout the

planning period, and should be open to all. The program should be widely publicized and citizen access to the process should be easy.

Mandatory Elements

A public hearing or hearings held prior to adoption of the facilities plan by the implementing governmental units is required. In exceptional circumstances, the public hearing may be waived by the Regional Administrator of EPA at the request of the planning entity.

A Summary of Public Participation must be prepared and submitted as part of the Facilities Plan. This Summary must describe the measures taken to provide for, encourage, and assist public participation in the facilities planning process; the public response to such measures; the significant suggestions and views of concerned interests; and the disposition of the issues raised.

## REPORTS

The planning report should contain essentially the material included in the sample table of contents in Figure 3. Supporting appendices should contain:

a) Preliminary Designs, Technical Data and Cost Estimates for alternatives;

b) Agreements, Resolutions and Comments; and

c) Supplemental engineering feasibility data on the features included in the first stage development of the adopted plan.

FIGURE 3 (continued)

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VII. FUTURE WASTE LOADS and FLOWS

A. Land Use
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VIII. ALTERNATIVES

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C. Evaluation
D. Description of Proposals

IX. PLAN SELECTION

A. Views of Public and Concerned Interests
B. Tradeoff Evaluation and Ranking of Proposals
C. Selected Plan and Reasons for Selection

X. THE SELECTED PLAN

A. Description and Maps
B. Phasing of Development
C. Operation and Maintenance Requirements
D. Cost Estimates
E. Summary of Environmental Effects
F. Summary of Public Participation

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B. Implementations Steps
C. Construction Implementation Schedule
D. Financial Requirements
E. Continuing Data Collection and Monitoring

FIGURE 3

SAMPLE TABLE OF CONTENTS


I. SUMMARY, CONCLUSIONS and RECOMMENDATIONS

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- A. Study Purpose and Scope
- B. Planning Area Description (map)
- C. Planning Participation and Coordination

III. WATER QUALITY OBJECTIVES and OTHER WATER MANAGEMENT GOALS

- A. Water Quality Objectives
- B. Other Water Management Goals

IV. SUMMARY OF POLLUTION SOURCES, WASTE LOADS, and WATER QUALITY

- A. Locations of Municipal and Industrial Point Sources (map)
- B. Municipal Waste Loads
- C. Industrial Waste Loads
- D. Summary of Receiving Water Quality

V. EXISTING WASTE TREATMENT SYSTEMS and FLOWS

- A. Municipal
- B. Separate Storm Sewers
- C. Other Wastewater Sources

VI. ENVIRONMENTAL INVENTORY

## REVIEW, CERTIFICATION AND APPROVAL OF PLANS

The review, certification and approval process for facilities plans is shown in Figure 4. The three approvals (A-95, State, and EPA) are sequential. The State has primary responsibility for non-Federal reviews. The sewer system evaluation elements of a facilities plan may be reported and reviewed separately in accordance with procedures set forth in 40 CFR, Part 35, Subpart E.

Because of changing conditions, plans may become outdated or invalid and should be regularly reviewed and updated. Prior to application for a design grant or a grant for building treatment works, the facilities plan is to be reviewed by the State to determine whether plan revision or amendment is needed. In the plan revision process, a statement on the status of implementation of the plan is to be included in the planning report. The EPA Regional Administrator(s), A-95 Clearinghouse(s) and State(s) are to be notified at least 30 days before beginning plan modification.

The EPA review will include specific determinations that:

1. The plan is consistent with existing State and NPDES permits.

2. The plan is consistent with the requirements of the applicable basin plan developed or being developed under 40 CFR 131.

3. The plan is consistent with any areawide plan developed under Section 208 of the Act.

4. All requirements for public participation regarding plan development and approval have been met.

5. The plan will provide for secondary treatment as a minimum, appropriate application of Best Practicable Waste Treatment Technology in accordance with technical criteria established by EPA, or for any more stringent effluent limitations required to meet water quality standards.

6. The plan is cost-effective and environmentally sound.

7. Excessive infiltration/inflow does not exist or that a detailed sewer evaluation survey and necessary sewer rehabilitation measures will be accomplished.

8. Implementation of the plan is institutionally feasible within the time period proposed.

9. The plan is compatible with plans developed for contiguous areas of other States.

FIGURE 4

REVIEW, CERTIFICATION, and APPROVAL OF PLANS

| Levels of Review | Action Taken | Required Documents |
|---|---|---|
| A-95 Clearinghouse | 1. Certify compliance with OMB Circular A-95<br>2. Certify compliance with project with approved plan | 1. Grant application<br>2. Plan of Study (Step 1 project)<br>3. Facilities Plan (Steps 2 or 3 projects) |
| State water pollution Control Agency | 1. Technical Review<br>2. Policy review for compliance with State requirements<br>3. Certification that plan meets requirements of 40 CFR Part 35, Subpart E. | 1. Facilities plan (4 copies)<br>2. A-95 documents (2 copies)<br>3. Letter from chief official of local agency requesting review and approval (Original & 1 copy) |
| EPA Regional Office, Air & Water Programs Division | Approves facilities plan or rejects it. Gives reasons in case of rejection, in addition to recommendations for correcting plan. | 1. Letter from State water pollution control official, requesting review and approval.**<br>2. 2 copies of plan<br>3. 1 copy of letter from local agency to State. |

*Must state that a) public participation requirements have been met and b) names of jurisdictions within planning area which oppose plan or haven't approved plan.

**Must certify that a) the plan conforms with requirements of 40 CFR Part 35, Subpart E, b) the facilities plan conforms with the applicable basin plan developed or being developed, the concerned 208 planning agency has been afforded the an opportunity to comment upon the plan and the plan conforms with any approved 208 plan.